OFFSETTING ILLEGITIMACY: THE INFLUENCE OF SECURITIES ANALYSTS ON INCUMBENTS FACING NEW TECHNOLOGIES

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INTRODUCTION

Prior research has explored the challenges and opportunities for firms faced with major technological changes in their environments (e.g. Henderson & Clark, 1990; Tushman & Anderson, 1986). But research in the technology change literature generally has not considered how pressures from firms' institutional environments influence the challenges of adaptation. Although firms may face strong technical pressures to change strategy and invest in new knowledge and capabilities (cf. Agarwal & Helfat, 2009), the strategic changes required to respond to new technologies may trigger a misalignment between firms' actions and the expectations arising from their traditional investor or analyst category (Zuckerman, 1999; Benner, 2007). Prior research has not addressed how these tensions affect the subsequent strategies firms pursue in the face of a radical technological change. Our focus is on how firms simultaneously manage these potentially divergent technological and institutional pressures.

Using a panel data study of firms in three industries facing technological change, we find that analysts' recommendations affected firms' subsequent strategic investments. In particular, our results show that increasingly negative recommendations from analysts dampened firms' future investments. Results suggest that the firms that continued to invest despite countervailing pressures from analysts were more likely to offset their growing illegitimacy by announcing share repurchases, taken-for-granted activities for signaling alignment with shareholders and improving stock price. Thus, firms may persist in activities to respond to the technological change while decoupling these actions from other taken-for-granted practices that enhance perceptions of legitimacy.

THEORY AND HYPOTHESIS DEVELOPMENT

Following existing research (e.g. Zuckerman, 1999; 2000; Benner 2009), we focus on the potential for pressures from sell-side securities analysts arising from their role as mediators in public equity markets. Securities analysts assess the performance of firms and publish periodic reports including forecasts of a firm's future stock price and recommendations about whether to "buy," "hold," or "sell" a firm's stock (e.g. Schipper, 1991; Westphal & Clement, 2008). Echoing work in institutional theory that highlights the role of categories or logics in pressures on firms, securities analysts' coverage is organized by industry category, and each analyst typically covers a single industry (Schipper, 1991; Zuckerman, 1999). The importance of analysts is underscored by prior research that has shown that securities analysts' evaluations and

recommendations have a significant impact on the price and trading volume of a firm's stock (e.g. Womack, 1996).

Analysts' recommendations affect firms' strategies and actions through two main mechanisms. First, they influence firms' strategies indirectly, through their influences on investors' behaviors and resulting stock prices. Positive or negative views from analysts about a stock affect investors' purchase behaviors (Womack, 1996; Nocera, 1997), and influence market value (Rao & Sivakumar, 1999; Beunza & Garud, 2007). Researchers have modeled how managerial attention to shareholders 'and what the market wants' likely influences firms' actions (e.g. Aghion & Stein, 2008). Thus, analysts influence the behavior of firms by affecting investors' stock purchases and resulting stock prices. In addition, analysts exert direct pressure on managers through interactions during earnings conference calls and meetings. In these exchanges, analysts often discuss the views of investors and clarify and question the firm's quarterly financial performance and associated strategies. An illustration of the pressures managers experience is provided by the text from a Verizon analyst meeting. At the time, Verizon is increasing its investments to respond to the competitive threat enabled by the technological change. In response to an analyst's question to clarify Verizon's increased capital investments, CEO Ivan Seidenberg responds: [emphasis added] "Here's what I believe. I think our Company cannot be afraid of you, and not be afraid of the market, in terms of reaching for growth opportunities. Now, we have to be smart and we have to be accountable, but what we don't want to do is start out by limiting what our vision of the market could be. So...I think what we need to do is build the capability to win, and not be afraid to win. That's where we are... we'll be a lot more different five years out..." (Seidenberg, October 28, 2004)

Further, the conference call and analysts' report texts suggest that in these changing contexts, analysts believe value is created for incumbent firms by cutting costs, increasing cash flow, and returning cash to shareholders. In general, the negative reactions and pressures from analysts are manifested specifically as encouragement for incumbent firms to return capital to shareholders by reversing their investments to respond to the new technology, thereby increasing cash flow.¹ For example: "Key investment thesis is free cash flow generation – cash allows deleveraging balance sheet..." (Deutsche Bank report on Verizon, 2003); and "…we like the company's projected ability to generate solid free cash flow…" (Morgan Stanley, reports on Verizon, 2002, 2003).

Research in institutional theory suggests that organizations will conform to institutional pressures in their environments (DiMaggio & Powell, 1983). In our setting, this suggests that a change in strategy will result from changes in analysts' recommendations, and more specifically, that firms will reduce investments in response to increasingly negative recommendations.

Hypothesis 1: Increasingly negative recommendations from analysts will be associated with reductions in a firm's strategic investments during periods of radical technological change.

Although a predominant view in institutional theory research is that firms will conform to institutional pressures, increasingly researchers have challenged that view that organizations are necessarily constrained by institutions (cf. Oliver, 1991; D'Aunno et al, 2000; Kraatz & Zajac, 1996). Research has proposed and found that in part, firms address institutional constraints by decoupling symbolic responses to the institutional pressures from the firms' core activities and strategies (Meyer & Rowan, 1977; Westphal & Zajac, 1998; 2001).

Technical pressures for adaptation and survival are particularly strong in situations of radical technological change. Although above we predict that the central tendencies will be for

firms to conform to institutional pressures by reducing strategic investments, some firms are likely to persist in maintaining or increasing investments to respond to technical pressures for survival (Kraatz & Zajac, 1996). As they do so, such firms will face heightened pressures to regain legitimacy with analysts and shareholders (cf. Suchman, 1995). Under these conditions, firms will seek approaches to mitigate the pressure in ways that do not directly affect their operational strategies (cf. Oliver, 1991). Persistent negative recommendations from analysts as firms maintain their strategic investments will likely trigger pressure to improve stock price and spur an increase in taken-for-granted activities that improve stock prices. A widely-studied approach for returning cash to shareholders and improving stock price is a share repurchase. In such an event, the firm announces that it will buy back its own shares at a price above the current market price (e.g. Zajac & Westphal, 2004). A large body of prior research in finance and accounting shows consistently that announcements of share repurchases trigger increases in stock price and market value (e.g. Chan, Ikenberry, & Lee, 2004; Lee, Mikkelson, & Partch, 1992; Vermaelen, 1981). In recent years, share repurchase announcements have become an increasingly taken-for-granted mechanism to improve stock price. Announcements trigger an increase in stock price even if, as Zajac & Westphal (2004) find, shares are not actually repurchased. This work suggests that share repurchase announcements are associated with increased perceptions of legitimacy by shareholders, even in the absence of any technical or efficiency benefits. Thus, firms are likely to announce share repurchases as an effective way to signal commitment to shareholders and offset the growing illegitimacy of continuing their strategic direction and level of investment.

Hypothesis 2: The likelihood of share repurchase announcements will be greater under conditions of high or increasing strategic investments and negative or decreasing analysts' recommendations (i.e. increases in strategic investments in the face of negative analyst recommendations will be associated with a greater likelihood of share repurchase announcements.)

METHODS

Sample and variables

We test our hypotheses using a large sample statistical study of incumbent firms in three settings faced with the challenges of responding to radical technological changes: photography (SIC 3861), faced with the threat of digital technology as a substitute for silver halide film technology (Tripsas & Gavetti, 2000; Benner & Tushman, 2002; Benner, 2010), wireline telecommunications (SIC 4813), involving the incumbent telephone companies faced with the threat of Internet telephony as a substitute for copper wireline technology (Benner, 2010; Benner & Ranganathan, 2009), and newspaper publishing (SIC 2711), faced with the Internet and the threat of on-line media substituting for printed media (e.g. Gilbert, 2005). We compare firms in those contexts with contexts not faced with the threat of technological substitution, firms in SIC code 20 (food and kindred products). We also take advantage of these technologically changing settings as natural experiments. The increased uncertainty associated with radical technological changes.

Our independent variable in this study is the mean value of *analysts' recommendations* from the I/B/E/S summary (consensus) file. The consensus recommendation variable is coded as follows: 1=Strong Buy, 2=Buy, 3=Hold, 4=Underperform, and 5=Sell. An increase in this

variable therefore indicates more *negative* analysts' recommendations. In our models, this variable is lagged one year. The dependent variables in the study are *capital expenditures* (collected from COMPUSTAT), which capture future-oriented strategic decisions (cf. Litov, et al, 2009; Maritan, 2001; Kotha & Nair, 1995) and repurchase announcements (from Securities Data Corporation). We also include several controls. First, our study design is panel data with firm fixed effects, allowing us to control for stable firm characteristics (i.e. differences across firms) and therefore capture the effects of *changes* in analysts' ratings and control variables on changes in our dependent variables. Using fixed effects controls in a longitudinal panel design conditions on the within-firm changes over time rather than the between-firm variation (Hsiao, 1986; Woolridge, 2003). We include year dummy variables to control for conditions that affect all firms in the panel in a particular year. In addition, we control for the lagged dependent variable, which captures additional unobserved factors and allows us to focus on the year-to-year changes in the dependent variable. We include additional controls to account for other factors affecting analysts' recommendations as well as firms' investment decisions and repurchase announcements, including: firm revenue, earnings per share, cash, long-term debt to equity, industry revenue (the sum of revenue by 2-digit SIC code) stock price, and the number of analysts' recommendations, i.e. the number of analysts covering the firm. Since we are interested in the relationship between analysts' recommendations and firms' strategies during periods of technological change, we code a *technological change dummy* variable with a value of '1' in the years for the firms in an industry undergoing a technological change (firms in SIC codes 3861, 4813, and 2711 during the period 2000-2007), and '0' otherwise.

Models

Our models to test H1 assess how changes in analysts' ratings affect changes firms' investment strategies. We use the natural log of capital expenditures and we lag the independent and control variables one year. Our data are annual, and our firm/year models incorporate year dummy variables and firm fixed effects. We use Arellano-Bond estimation (*xtabond* in STATA) since including a lagged dependent variable in the models with fixed effects controls violates the exogeneity assumptions of panel estimators.

We analyze the relationship between analysts' recommendations and capital expenditures in two ways. First, we narrow our analysis specifically to the subset of firm/years that are undergoing technological change. Second, we also run the full sample model with an interaction term that isolates the effect of analysts' ratings specifically for the firms facing radical technological changes. In the second approach, the coefficient on the interaction term allows a comparison of whether and how the effect on the technology change firms differs from the overall sample. We also compare this with results from similar analyses of the firms in industries and years not undergoing technological change.

Our model to test H2 involves repurchase announcements, which are events, coded 1 in the year when a repurchase in announced, and 0 otherwise. Following prior research (e.g. Haunschild & Miner, 1997), we use a panel data logistic model for this analysis (the *xtlogit* command in STATA). We use a random effects specification that allows us to account for the non-independence of firm/year observations. Interpretation challenges can arise in logit models (Hoetker, 2007; Ai & Norton, 2003), so we also ran several linear models for comparison, including panel data with random effects, fixed effects, and Arellano-Bond estimation. Finding similar results in linear models reinforces the findings from the logit models and also allows for a

more straightforward interpretation of the magnitude and significance of the results. This model includes an interaction term to capture the influence of increasingly high capital expenditures and increasingly negative analysts' ratings on the likelihood of repurchases. When the values of the interaction term are at high levels (when capital expenditures increase in the current period despite analysts' negativity in an earlier period), we expect a stronger positive effect on repurchases.

Our panel data models also have other statistical advantages. By including a lagged dependent variable and also employing fixed effects controls, our models are relying on a differences-in-differences design. In addition, the model design includes comparing the pre- and post-tests with a baseline set of firms not undergoing technological change. Thus, the design allows for statistical assessment of the differences in analysts' influences on firms over time, within-firm, both in and outside of the technological changes, as well as compared to periods before and after the technological changes.

RESULTS

The results of our tests of H1 show a negative and significant coefficient on analysts' recommendations (at p < .01), for firms undergoing technological change, suggesting that more negative recommendations in the earlier period have a negative and strongly significant effect on subsequent capital expenditures. We also ran models using the full sample of data that included an interaction term (technology change dummy variable x analysts' recommendations) to isolate the effect of changes in analysts' ratings specifically on firms in the technology change settings. The coefficient on the interaction term is negative and significant (at p < .01), indicating that the negative effect of analysts' reactions on future investments is stronger for the firms faced with technological change than for the rest of the sample. Our results were robust to fixed effects controls and Arellano-Bond estimation. These results suggest general support for H1, that negative analysts' reactions will spur firms to reduce their subsequent strategic investments during periods of technological change.

In our tests of H2, the coefficient on the variable of interest, the interaction between analysts' ratings_{i,t-1} and capital expenditures_{i,t} was positive and significant (at p<.05) for firms in the technological change settings. These results show that firms in periods of technological change are more likely to announce repurchases when they have high levels of capital investment coupled with more negative analyst ratings. These results provide support for H2, suggesting that higher levels of investment in the face of negative analysts' ratings may drive firms to pursue taken-for-granted actions, such as share repurchases, to offset their increasing illegitimacy.

DISCUSSION

We address an important question that has not been studied in prior research: how do institutional pressures influence organizational strategies and actions when firms are faced with a radical technological change? Existing research has studied the influence of internal organizational factors on incumbents' challenges responding to new technologies, but has generally not explored the role of external institutional pressures. We examine how sell-side securities analysts, as a potential source of institutional pressure, affect firms' strategies during periods of radical technological change.

We find a consistent and significant effect of analysts' recommendations on subsequent strategic investments for firms undergoing technological change. We also find that firms facing technological change are more likely to announce share repurchases under conditions of negative analysts' ratings coupled with high capital expenditures. That is, firms appear to use repurchases as a substitute for conforming to the pressures from analysts to change strategy and reduce investments. This situation is counter-intuitive given the traditional view of cash payouts to shareholders, i.e. if firms have worthwhile investments to make, they would be less likely to repay cash to shareholders (Zajac & Westphal, 2004). Yet firms are engaging simultaneously in these actions that have inconsistent logical underpinnings. During periods of technological change, managers may believe there are important, appropriate investments to make, for example in new technological knowledge and capabilities to ensure survival in the face of technological substitution, but during the uncertain era of technological ferment, there may be an increased potential for such investments to be difficult to value and appear as wasteful uses of cash that undermine shareholder value.

This work contributes to research at the intersection of organization theory, strategy, and technological change. This research shows how firms may decouple their responses to institutional pressures from their ongoing operational activities to adapt to technological change by adopting taken-for-granted institutional mechanisms as a way to offset the increasing illegitimacy of their investments. Further, we extend institutional theory into the domain of technological change. Although a large body of work in has explored the effects of institutional pressures on organizations (e.g. DiMaggio & Powell, 1983), research in the technological change literature has generally not studied the role of external pressures in the challenges that incumbents face in responding to this change. Our findings provide further insight into how the external pressures on firms faced with technological change might encourage or reinforce the apparent managerial and organizational inertia documented in previous research (e.g. Tripsas & Gavetti, 2000; Henderson, 1993). This study also makes an important empirical contribution by providing evidence based on a large sample longitudinal study using robust methods. Our use of panel data models that condition on changes within-firm over time provides some assurance that it is not differences between firms that drive our findings, but changes in analysts' recommendations within-firm over time that cause the subsequent change in that firm's level of investment. Finally, this research contributes to management practice. Managers interested in guiding their organizations to successful adaptation and survival during periods of technological change must take steps to respond to a new technology before the uncertainty about future profit is resolved. Such conditions may make investments difficult to value, triggering opposing institutional pressures from analysts. It is important for managers to understand that these contrasting pressures are particularly likely under the conditions of high uncertainty associated with radical technological change.

REFERENCES AVAILABLE FROM THE AUTHORS

¹ Since stock price is the discounted value of future cash flows (e.g. Brealey and Myers, 1984), the link between improvements in cash flow and increased stock price is well established in research and practice.

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